

IN THE CLAIMS

The status of each claim is listed below.

Claims 1-14: Canceled.

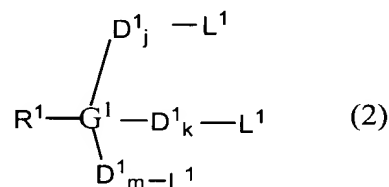
15. (Currently Amended) A catalyst for trimerizing ethylene, comprising:

(i) an organic metal complex having a neutral tridentate ~~multidentate~~ ligand having a tripod structure represented by the following formula (1):



wherein

A is a neutral tridentate ligand having a tripod structure represented by the following formula (2) or formula (3):



wherein

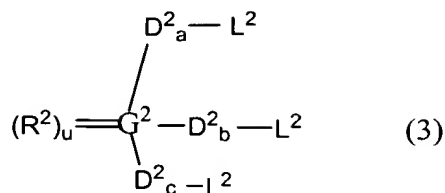
j, k and m independently represent an integer of 0 to 6,

each D^1 independently represents a divalent hydrocarbon group which may have a substituent,

each L^1 independently represents a substituent containing a nitrogen atom or a substituent containing and an element of group 16 of the periodic table,

G^1 represents a carbon atom, and

R^1 represents a hydrogen atom, an alkyl group having 1 to 10 carbon atoms which may have a substituent, or an aryl group having 6 to 10 carbon atoms which may have a substituent,



wherein

a, b and c independently represent an integer of 0 to 6,

u represents an integer of 0 or 1,

each D^2 independently represents a divalent hydrocarbon group which may have a substituent,

each L^2 independently represents a substituent containing a nitrogen atom or an element of group 16 of the periodic table,

G^2 represents a nitrogen or phosphorus atom when u is 0 or a phosphorus atom when u is 1,

R^2 represents an oxygen or sulfur atom,

M is a transition metal atom of group 3 to group 10 of the periodic table,

each Q is independently selected from the group consisting of a hydrogen atom, a halogen atom, a straight chain or branched alkyl group having 1 to 10 carbon atoms which may have a substituent, and an aryl group having 6 to 10 carbon atoms which may have a substituent, and

n is an integer equal to a formal oxidation state of M,

and

(ii) an alkylaluminoxane.

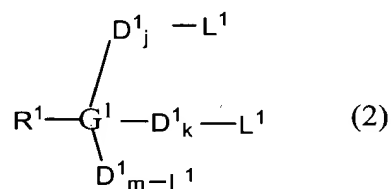
16. (Currently Amended) A catalyst for trimerizing ethylene, comprising:

(i) an organic metal complex having a neutral tridentate ~~multidentate~~ ligand having a tripod structure represented by the following formula (1):



wherein

A is a neutral tridentate ligand having a tripod structure represented by the following formula (2) or formula (3):



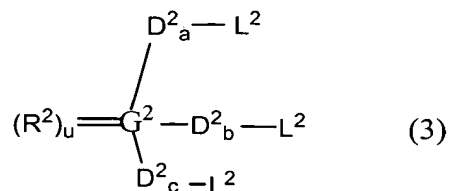
wherein

j, k and m independently represent an integer of 0 to 6,

each D^1 independently represents a divalent hydrocarbon group which may have a substituent,

each L^1 independently represents a substituent containing a nitrogen atom or an element of group 16 of the periodic table,

G^1 represents a carbon atom, and $\underline{R^1}$ represents a hydrogen atom, an alkyl group having 1 to 10 carbon atoms which may have a substituent, or an aryl group having 6 to 10 carbon atoms which may have a substituent,



wherein

a, b and c independently represent an integer of 0 to 6,

u represents an integer of 0 or 1,

each D^2 independently represents a divalent hydrocarbon group which may have a substituent,

each L^2 independently represents a substituent containing a nitrogen atom or an element of group 16 of the periodic table,

G^2 represents a nitrogen or phosphorus atom when u is 0 or a phosphorus atom when u is 1, and

R^2 represents an oxygen or sulfur atom,

M is a transition metal atom of group 3 to group 10 of the periodic table,

each Q is independently selected from the group consisting of a hydrogen atom, a halogen atom, a straight chain or branched alkyl group having 1 to 10 carbon atoms which may have a substituent, and an aryl group having 6 to 10 carbon atoms which may have a substituent, and

n is an integer equal to a formal oxidation state of M, and

(ii) an alkylaluminumoxane, and

(iii) a halogenated inorganic compound.

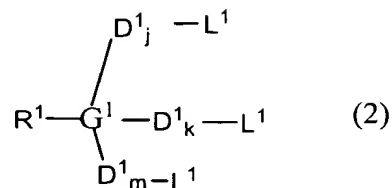
17. (Currently Amended) A catalyst for trimerizing ethylene, comprising:

(i) an organic metal complex having a neutral tridentate ~~multidentate~~ ligand having a tripod structure represented by the following formula (1):



wherein

A is a neutral tridentate ligand having a tripod structure represented by the following formula (2) or formula (3):



wherein

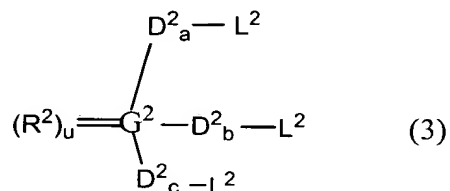
j, k and m independently represent an integer of 0 to 6,

each D^1 independently represents a divalent hydrocarbon group which may have a substituent,

each L^1 independently represents a substituent containing a nitrogen atom or an element of group 16 of the periodic table,

G^1 represents a carbon atom, and

R^1 represents a hydrogen atom, an alkyl group having 1 to 10 carbon atoms which may have a substituent, or an aryl group having 6 to 10 carbon atoms which may have a substituent,



wherein

a, b and c independently represent an integer of 0 to 6,

u represents an integer of 0 or 1,

each D^2 independently represents a divalent hydrocarbon group which may have a substituent,

each L^2 independently represents a substituent containing a nitrogen atom or an element of group 16 of the periodic table,

G^2 represents a nitrogen or phosphorus atom when u is 0, or a phosphorus atom when u is 1, and

R^2 represents an oxygen or sulfur atom,

M is a transition metal atom of group 3 to group 10 of the periodic table,

each Q is independently selected from the group consisting of a hydrogen atom, a halogen atom, a straight chain or branched alkyl group having 1 to 10 carbon atoms which may have a substituent, and an aryl group having 6 to 10 carbon atoms which may have a substituent, and

n is an integer equal to a formal oxidation state of M ,

(ii) an alkylaluminumoxane,

(iii) a halogenated inorganic compound, and

(iv) an alkyl group-containing compound represented by the following formula (4):



wherein

p and q are numbers satisfying the formulae: $0 < p \leq 3$ and $0 \leq q < 3$, provided that $(p + q)$ equals to the valence of E and $1 \leq (p + q) \leq 3$,

E represents an atom, other than a hydrogen atom, of group 1, 2, 3, 11, 12 or 13 of the periodic table,

each R independently represents an alkyl group having 1 to 10 carbon atoms, and

each J independently represents a hydrogen atom, an alkoxide group having 1 to 10 carbon atoms, an aryloxy group having 6 to 10 carbon atoms, an aryl group having 6 to 10 carbon atoms or a halogen atom.

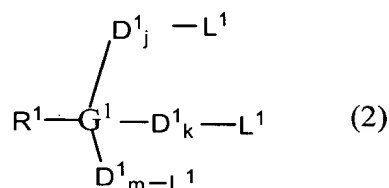
18. (Currently Amended) A catalyst for trimerizing ethylene, comprising:

(i) an organic metal complex having a neutral tridentate ~~multidentate~~ ligand having a tripod structure represented by the following formula (1):



wherein

A is a neutral tridentate ligand having a tripod structure represented by the following formula (2) or formula (3):



wherein

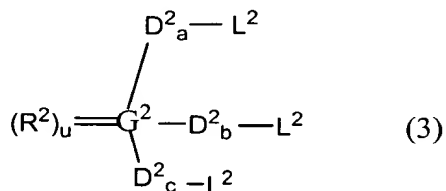
j, k and m independently represent an integer of 0 to 6,

each D^1 independently represents a divalent hydrocarbon group which may have a substituent,

each L^1 independently represents a substituent containing a nitrogen atom or an element of group 16 of the periodic table,

G^1 represents a carbon atom, and

R^1 represents a hydrogen atom, an alkyl group having 1 to 10 carbon atoms which may have a substituent, or an aryl group having 6 to 10 carbon atoms which may have a substituent,



wherein

a, b and c independently represent an integer of 0 to 6,

u represents an integer of 0 or 1,

each D^2 independently represents a divalent hydrocarbon group which may have a substituent,

each L^2 independently represents a substituent containing a nitrogen atom or an element of group 16 of the periodic table,

G^2 represents a nitrogen or phosphorus atom when u is 0, or a phosphorus atom when u is 1, and

R^2 represents an oxygen or sulfur atom,

M is a transition metal atom of group 3 to group 10 of the periodic table,

each Q is independently selected from the group consisting of a hydrogen atom, a halogen atom, a straight chain or branched alkyl group having 1 to 10 carbon atoms which may have a substituent, and an aryl group having 6 to 10 carbon atoms which may have a substituent, and

n is an integer equal to a formal oxidation state of M,

(ii) an alkylaluminoxane, and

(iii) an alkyl group-containing compound represented by the following formula (4):



wherein

p and q are numbers satisfying the formulae: $0 < p \leq 3$ and $0 \leq q < 3$, provided that $(p + q)$ equals to the valence of E and $1 \leq (p + q) \leq 3$,

E represents an atom, other than a hydrogen atom, of group 1, 2, 3, 11, 12 or 13 of the periodic table,

each R independently represents an alkyl group having 1 to 10 carbon atoms, and

each J independently represents a hydrogen atom, an alkoxide group having 1 to 10 carbon atoms, an aryloxy group having 6 to 10 carbon atoms, an aryl group having 6 to 10 carbon atoms or a halogen atom.

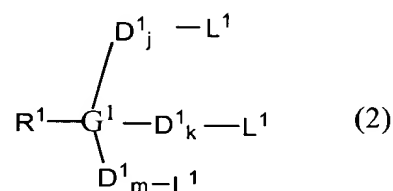
19. (Currently Amended) A catalyst for trimerizing ethylene, comprising:

(i) an organic metal complex having a neutral tridentate ~~multidentate~~ ligand having a tripod structure represented by the following formula (1):



wherein

A is a neutral tridentate ligand having a tripod structure represented by the following formula (2) or formula (3):



wherein

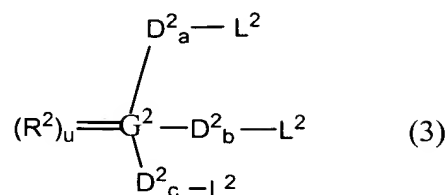
j, k and m independently represent an integer of 0 to 6,

each D^1 independently represents a divalent hydrocarbon group which may have a substituent,

each L^1 independently represents a substituent containing a nitrogen atom or an element of group 16 of the periodic table,

G^1 represents a carbon atom, and

R^1 represents a hydrogen atom, an alkyl group having 1 to 10 carbon atoms which may have a substituent, or an aryl group having 6 to 10 carbon atoms which may have a substituent,



wherein

a, b and c independently represent an integer of 0 to 6,

u represents an integer of 0 or 1,

each D^2 independently represents a divalent hydrocarbon group which may have a substituent,

each L^2 independently represents a substituent containing a nitrogen atom or an element of group 16 of the periodic table,

G^2 represents a nitrogen or phosphorus atom when u is 0 or a phosphorus atom when u is 1, and

R^2 represents an oxygen or sulfur atom,

M is a transition metal atom of group 3 to group 10 of the periodic table,

each Q is independently selected from the group consisting of a hydrogen atom, a halogen atom, a straight chain or branched alkyl group having 1 to 10 carbon atoms which may have a substituent, and an aryl group having 6 to 10 carbon atoms which may have a substituent, and

n is an integer equal to a formal oxidation state of M,

(ii) an alkylaluminumoxane, and

(iii) at least one compound selected from the group consisting of an amine compound and an amide compound.

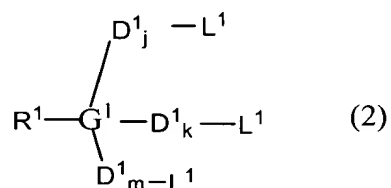
20. (Currently Amended) A catalyst for trimerizing ethylene, comprising:

(i) an organic metal complex having a neutral tridentate ~~multidentate~~ ligand having a tripod structure represented by the following formula (1):



wherein

A is a neutral tridentate ligand having a tripod structure represented by the following formula (2) or formula (3):



wherein

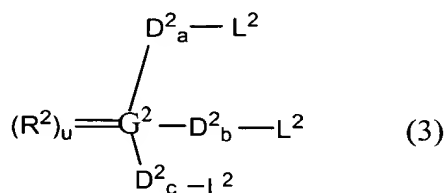
j, k and m independently represent an integer of 0 to 6,

each D^1 independently represents a divalent hydrocarbon group which may have a substituent,

each L^1 independently represents a substituent containing a nitrogen atom or an element of group 16 of the periodic table,

G^1 represents a carbon atom, and

R^1 represents a hydrogen atom, an alkyl group having 1 to 10 carbon atoms which may have a substituent, or an aryl group having 6 to 10 carbon atoms which may have a substituent,



wherein

a, b and c independently represent an integer of 0 to 6,

u represents an integer of 0 or 1,

each D^2 independently represents a divalent hydrocarbon group which may have a substituent,

each L^2 independently represents a substituent containing a nitrogen atom or an element of group 16 of the periodic table,

G^2 represents a nitrogen or phosphorus atom when u is 0 or a phosphorus atom when u is 1, and

R^2 represents an oxygen or sulfur atom,

M is a transition metal atom of group 3 to group 10 of the periodic table,

each Q is independently selected from the group consisting of a hydrogen atom, a halogen atom, a straight chain or branched alkyl group having 1 to 10 carbon atoms which may have a substituent, and an aryl group having 6 to 10 carbon atoms which may have a substituent, and

n is an integer equal to a formal oxidation state of M,

(ii) an alkylaluminumoxane,

(iii) at least one compound selected from the group consisting of an amine compound and an amide compound, and

(iv) an alkyl group-containing compound represented by the following formula (4):



wherein

p and q are numbers satisfying the formulae: $0 < p \leq 3$ and $0 \leq q < 3$, provided that $(p + q)$ equals to the valence of E and $1 \leq (p + q) \leq 3$,

E represents an atom, other than a hydrogen atom, of group 1, 2, 3, 11, 12 or 13 of the periodic table,

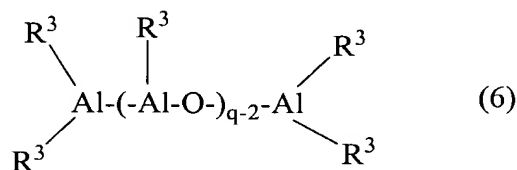
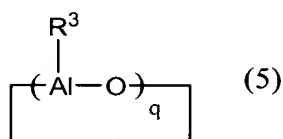
each R independently represents an alkyl group having 1 to 10 carbon atoms, and

each J independently represents a hydrogen atom, an alkoxide group having 1 to 10 carbon atoms, an aryloxy group having 6 to 10 carbon atoms, an aryl group having 6 to 10 carbon atoms or a halogen atom.

21. (Previously Presented) A catalyst according to any one of Claims 15 to 20, wherein the organic metal complex is an organic chromium complex in which M is a chromium atom.

22. (Previously Presented) A catalyst according to any one of Claims 15 to 20, wherein A is facially coordinated to a transition metal atom M of group 3 to group 10 of the periodic table in the organic metal complex represented by formula (1).

23. (Previously Presented) A catalyst for according to any one of Claims 15 to 20, wherein the alkylaluminoxane is at least one compound selected from the group consisting of compounds represented by the following formulae (5) and (6):



wherein

each R^3 independently represents a hydrogen atom or a hydrocarbon group having 1 to 20 carbon atoms, and

q is an integer of 3 to 60.

24. (Currently Amended) A catalyst according to Claim 16 or 17, wherein the halogenated inorganic compound is represented by the following formula (7):



wherein

Z is an atom of group 1, 2, 13, 14 or 15 of the periodic table,

X represents a halogen atom, and

h denotes an integer making ZX_h electrically neutral ~~to neutralize the formal oxidation state of Z.~~

25. (Previously Presented) A catalyst according to Claim 19 or 20, wherein each of the amine compound and the amide compound has at least one nitrogen atom having three substituents other than hydrogen atoms, and has 3 to 30 carbon atoms.

26. (Previously Presented) A process for trimerizing ethylene, comprising trimerizing ethylene in the presence of a catalyst as claimed in any one of Claims 15 to 20.

Application No. 09/964,587
Reply to Office Action of September 24, 2004

SUPPORT FOR THE AMENDMENTS

The claims have been amended to make the changes suggested by the Examiner at pages 2-3 of the Official Action dated September 24, 2004, which are supported by the specification and the original claims. Accordingly, no new matter is believed to have been added to the present application by the amendments submitted above.